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“YOSHLAR VA TA’LIM: INNOVATSION YONDASHUVLAR” MAVZUSIDAGI RESPUBLIKA ILMIY KONFERENSIYASI

SMART ACCESS

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2. Tibbiyot va farmatsevtika fanlari sho‘basi
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Assalomu alaykum, hurmatli mehmonlar, muhtaram ustozlar, qadrli hamkasblar hamda aziz talabalar!

Hech kimga sir emaski, ko'z o'ngimizda kechayotgan zamonaviy turmush tarzi, yashash muhiti hamda erishilgan natijalar bir necha ming yillik tarixiy taraqqiyot jarayonida to'plangan amaliy tajribalarning yakuniy mahsuli hisoblanadi. Asrlar davomida inson o'zining intellektual salohiyati, tafakkuri va mehnati orqali muhim ilmiy-texnik kashfiyotlarni amalga oshirib, ularni keng miqyosda amaliyotga joriy etish natijasida ijtimoiy-iqtisodiy farovonlikni ta'minlab kelmoqda.

Shiddat bilan modernizatsiyalashib va transformatsiyalanib borayotgan hozirgi davr sharoitida "yashil" iqtisodiyot modeliga o'tish strategik zarurat va muhim hayotiy ehtiyoj sifatida namoyon bo'lmoqda.

Anjuman qatnashchilariga samimiy minnatdorchiligimni bildiraman va konferensiyada faol ishtirok etib, o'z tajribalari bilan o'rtoqlashishlari, mazkur mavzuda olib borgan tadqiqotlari yuzasidan tegishli tavsiya hamda xulosalarini berishlarini umid qilaman.

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2-SHO'BA

TIBBIYOT VA FARMATSEVTIKA FANLARI SHO‘BASI

СЕКЦИЯ МЕДИЦИНСКИХ И ФАРМАЦЕВТИЧЕСКИХ НАУК

SECTION OF MEDICAL AND PHARMACEUTICAL SCIENCES

Ichak mikrobiotasining metabolik va immun kasalliklardagi biokimyoviy hamda funksional ahamiyati

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ToshDavTU, Tibbiy va biologik kimyo, tibbiy biologiya, biofizika va tibbiy informatika kafedrasi

Annotatsiya

Ushbu tezisda ichak mikrobiotasining inson organizmidagi metabolik jarayonlar, immun tizim faoliyati hamda turli kasalliklar rivojlanishidagi o‘rni keng yoritilgan. Ichak mikrobiotasi inson tanasida yashovchi trillionlab mikroorganizmlar majmuasi bo‘lib, ular hazm qilish, oziq moddalarning so‘rilishi, vitaminlar sintezi, energiya almashinuvi va immun himoyada ishtirok etadi. So‘nggi yillarda olib borilgan tadqiqotlar ichak mikrobiotasidagi disbioz semizlik, qandli diabet, ateroskleroz, allergik va autoimmun kasalliklar bilan uzviy bog‘liqligini ko‘rsatmoqda. Shuningdek, probiotiklar, prebiotiklar va ratsional ovqatlanish orqali mikrobiotani tiklash imkoniyatlari ham muhokama qilingan.

Kalit so‘zlar

Ichak mikrobiotasi, disbioz, metabolizm, immunitet, probiotik, prebiotik, semizlik, diabet, autoimmun kasalliklar, biokimyo.

Kirish

Inson organizmi murakkab biologik tizim bo‘lib, uning normal faoliyati nafaqat o‘z hujayralari, balki tanada yashovchi mikroorganizmlar bilan ham chambarchas bog‘liqdir. Ayniqsa, ichak mikrobiotasi salomatlikni saqlashda alohida ahamiyat kasb etadi. Ichakda milliardlab bakteriyalar, viruslar, zamburug‘lar va boshqa mikroorganizmlar yashaydi. Ularning umumiy genetik materiali inson genomidan bir necha barobar ko‘p bo‘lib, organizm faoliyatiga sezilarli ta’sir ko‘rsatadi

Ilm-fan taraqqiyoti natijasida ichak mikrobiotasi faqat hazm jarayonida emas, balki metabolik kasalliklar, yurak-qon tomir kasalliklari, immun tanqisligi, allergik va autoimmun kasalliklar rivojlanishida ham muhim rol o‘ynashi aniqlangan. Shu sababli bugungi kunda ichak mikrobiotasini o‘rganish tibbiyotning dolzarb yo‘nalishlaridan biri hisoblanadi.

Ichak mikrobiotasining tarkibi va asosiy vazifalari

Ichak mikrobiotasi tarkibiga asosan Lactobacillus, Bifidobacterium, Bacteroides, Firmicutes, Escherichia coli kabi mikroorganizmlar kiradi. Ularning soni va nisbati yoshga, ovqatlanish turiga, yashash sharoitiga, antibiotik qabul qilishga hamda irsiy omillarga bog‘liq ravishda o‘zgaradi.

Normal mikroflora quyidagi asosiy vazifalarni bajaradi:

Hazm qilish jarayonida ishtirok etadi. Murakkab uglevodlar, o‘simlik tolalari va ayrim oqsillarni parchalaydi.

Vitaminlar sintez qiladi. Ayniqsa K vitamini, B1, B6, B12, folat va biotin sintezida qatnashadi.

Immun himoyani kuchaytiradi. Patogen mikroblarning ichakka yopishishini oldini oladi.

Ichak shilliq qavatini himoya qiladi. Epiteliy hujayralari regeneratsiyasini qo‘llab-quvvatlaydi.

Moddalar almashinuvini boshqaradi. Energiya balansi va lipid almashinuviga ta’sir ko‘rsatadi.

Ichak mikrobiotasining biokimyoviy ahamiyati

Ichak mikroorganizmlari organizmda ko‘plab biokimyoviy reaksiyalarni amalga oshiradi. Ular fermentativ faoliyat orqali inson hazm qila olmaydigan moddalarni parchalaydi va foydali metabolitlar hosil qiladi.

Qisqa zanjirli yog‘ kislotalari hosil bo‘lishi

Ichak bakteriyalari o‘simlik tolalarini fermentatsiya qilib, asetat, propionat va butirat hosil qiladi. Ushbu moddalar quyidagi vazifalarni bajaradi:ichak epiteliy hujayralari uchun energiya manbai bo‘ladi;yallig‘lanishga qarshi ta’sir ko‘rsatadi;glyukoza almashinuvini yaxshilaydi;yog‘ to‘planishini kamaytiradi.

Butirat ayniqsa yo‘g‘on ichak hujayralari uchun muhim bo‘lib, ichak saratoni xavfini kamaytirishda ahamiyatlidir.

Safro kislotalari almashinuvi

Ichak mikrobiotasi safro kislotalarini ikkilamchi shakllarga aylantiradi. Bu jarayon yog‘larning parchalanishi va so‘rilishida muhim rol o‘ynaydi. Shu bilan birga, safro kislotalari orqali jigar va oshqozon osti bezi faoliyati ham boshqariladi.

Vitaminlar sintezi

Ichak bakteriyalari tomonidan sintez qilinadigan K vitamini qon ivishida zarur hisoblanadi. B guruhi vitaminlari esa nerv tizimi, qon hosil bo‘lishi va ferment tizimlari faoliyati uchun kerak bo‘ladi.

Ichak mikrobiotasining metabolik kasalliklardagi o‘rni

Semizlik

So‘nggi yillarda semizlik rivojlanishida ichak mikrobiotasining o‘rni katta ekani isbotlangan. Semiz insonlarda Firmicutes bakteriyalari ko‘payib, Bacteroidetes kamayishi kuzatiladi. Natijada oziq moddalardan energiya ajralishi kuchayadi va yog‘ zaxiralari ortadi.

Bundan tashqari, disbioz fonida surunkali yallig‘lanish yuzaga keladi. Bu esa leptin va insulin rezistentligiga olib keladi.

2-tip qandli diabet

Ichak mikrobiotasining buzilishi glyukoza almashinuviga salbiy ta’sir qiladi. Foydali bakteriyalar kamayganda ichak devori o‘tkazuvchanligi ortadi va endotoksinlar qonga o‘tadi. Bu holat insulin sezgirligini pasaytiradi.

Qisqa zanjirli yog‘ kislotalari esa insulin sekretsiyasini yaxshilaydi. Shu sababli probiotik terapiya diabetda istiqbolli yo‘nalish hisoblanadi.

Ateroskleroz

Ba’zi bakteriyalar xolin va karnitindan trimetilamin-N-oksid (TMAO) hosil qiladi. Ushbu modda ateroskleroz rivojlanishi va yurak-qon tomir kasalliklari xavfini oshiradi.

Ichak mikrobiotasining immun kasalliklardagi ahamiyati

Ichak inson immun hujayralarining katta qismi joylashgan organ hisoblanadi. Shu sababli mikrobiota immunitet bilan bevosita bog‘liq.

Allergik kasalliklar

Bolalik davrida mikrobiota shakllanishining buzilishi allergiya, atopik dermatit va bronxial astmaga olib kelishi mumkin. Antibiotiklarni ko‘p qo‘llash foydali bakteriyalarni kamaytirib, allergik javobni kuchaytiradi.

Autoimmun kasalliklar

Revmatoid artrit, qandli diabet 1-tip, Kron kasalligi va yarali kolit kabi kasalliklarda ichak disbiozi kuzatiladi. Mikroflora buzilganda immun tizim o‘z to‘qimalariga qarshi antitana ishlab chiqarishi mumkin.

Yallig‘lanishli ichak kasalliklari

Kron kasalligi va nonspetsifik yarali kolitda mikrobiota tarkibining o‘zgarishi yallig‘lanish jarayonini kuchaytiradi. Butirat ishlab chiqaruvchi bakteriyalar kamayadi.

Ichak mikrobiotasini tiklash usullari

Ratsional ovqatlanish

Sabzavot, meva, dukkaklilar, don mahsulotlari va fermentlangan oziq-ovqatlar foydali bakteriyalar o‘sishini rag‘batlantiradi.

Probiotiklar

Lactobacillus va Bifidobacterium saqlovchi preparatlar ichak florasini tiklaydi. Ular diareya, disbioz va immun pasayish holatlarida foydalidir.

Prebiotiklar

Inulin, fruktooligosaxaridlar va pektin foydali bakteriyalar uchun oziqa vazifasini bajaradi.

Antibiotiklarni me’yorida qo‘llash

Antibiotiklarni nazoratsiz qabul qilish mikrobiotaga jiddiy zarar yetkazadi. Shu sababli ularni faqat shifokor tavsiyasi bilan qo‘llash lozim.

Xulosa

Ichak mikrobiotasi inson organizmidagi eng muhim biologik tizimlardan biridir. U nafaqat hazm qilish jarayonida, balki metabolizm, immun himoya, vitaminlar sintezi va yallig‘lanish jarayonlarini boshqarishda faol ishtirok etadi. Mikroflora muvozanatining buzilishi semizlik, qandli diabet, ateroskleroz, allergik va autoimmun kasalliklar rivojlanishiga sabab bo‘lishi mumkin.sog‘lom ovqatlanish, faol turmush tarzi, probiotik va prebiotiklardan oqilona foydalanish orqali ichak mikrobiotasini me’yorda saqlash mumkin. Kelajakda mikrobiotaga asoslangan individual davolash usullari tibbiyotda keng qo‘llanilishi kutilmoqda.

Qo‘llanilgan adabiyotlar

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Zamonaviy mikrobiologiya va immunologiya bo‘yicha ilmiy manbalar.

Biochemical and Functional Importance of Intestinal Microbiota in Metabolic and Immune Diseases

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Annotation

This thesis discusses the role of intestinal microbiota in metabolic processes, immune system activity, and the development of various diseases in the human body. Intestinal microbiota is a complex community of trillions of microorganisms living in the gastrointestinal tract. These microorganisms participate in digestion, nutrient absorption, vitamin synthesis, energy metabolism, and immune protection. Recent scientific studies have shown that dysbiosis of intestinal microbiota is closely associated with obesity, diabetes mellitus, atherosclerosis, allergic, and autoimmune diseases. The possibilities of restoring microbiota balance through probiotics, prebiotics, and rational nutrition are also considered.

Keywords

Intestinal microbiota, dysbiosis, metabolism, immunity, probiotics, prebiotics, obesity, diabetes, autoimmune diseases, biochemistry.

Introduction

The human body is a complex biological system whose normal functioning depends not only on its own cells but also on the microorganisms living inside it. Among them, intestinal microbiota plays a particularly important role in maintaining health. The intestine contains billions of bacteria, viruses, fungi, and other microorganisms. Their total genetic material exceeds the human genome many times and significantly influences body functions.

Scientific progress has revealed that intestinal microbiota is involved not only in digestion but also in metabolic disorders, cardiovascular diseases, immune deficiency, allergic reactions, and autoimmune diseases. Therefore, the study of intestinal microbiota has become one of the most important directions in modern medicine.

Composition and Main Functions of Intestinal Microbiota

The intestinal microbiota mainly includes Lactobacillus, Bifidobacterium, Bacteroides, Firmicutes, and Escherichia coli. Their quantity and ratio depend on age, type of nutrition, living conditions, antibiotic use, and genetic factors.

Normal intestinal microflora performs the following functions:Participation in digestion

It helps break down complex carbohydrates, plant fibers, and certain proteins.

Vitamin synthesis

It produces vitamin K, B1, B6, B12, folate, and biotin.

Strengthening immune defense

It prevents pathogenic microorganisms from attaching to the intestinal wall.

Protection of intestinal mucosa

It supports regeneration of epithelial cells.

Regulation of metabolism

It influences energy balance and lipid metabolism.

Biochemical Importance of Intestinal Microbiota

Intestinal microorganisms participate in many biochemical reactions in the body. Through enzymatic activity, they decompose substances that humans cannot digest and produce beneficial metabolites.

Formation of Short-Chain Fatty Acids

Intestinal bacteria ferment dietary fibers and produce acetate, propionate, and butyrate. These substances perform several important functions:serve as an energy source for intestinal epithelial cells;have anti-inflammatory effects;improve glucose metabolism;reduce fat accumulation.

Butyrate is especially important for colon cells and may reduce the risk of colon cancer.

Bile Acid Metabolism

Intestinal microbiota transforms bile acids into secondary forms. This process is essential for digestion and absorption of fats. Bile acids also regulate liver and pancreatic functions.

Vitamin Synthesis

Vitamin K synthesized by bacteria is necessary for blood clotting. B-group vitamins are important for the nervous system, blood formation, and enzyme activity.

Role of Intestinal Microbiota in Metabolic Diseases

Obesity

Recent studies have proven that intestinal microbiota plays an important role in obesity. In obese individuals, the number of Firmicutes increases while Bacteroidetes decreases. As a result, energy extraction from food becomes more efficient and fat storage increases.

In addition, dysbiosis leads to chronic inflammation, which contributes to leptin and insulin resistance.

Type 2 Diabetes Mellitus

Disturbance of intestinal microbiota negatively affects glucose metabolism. When beneficial bacteria decrease, intestinal permeability increases and endotoxins enter the bloodstream. This reduces insulin sensitivity.

Short-chain fatty acids improve insulin secretion, making probiotic therapy a promising supportive method in diabetes management.

Atherosclerosis

Some bacteria convert choline and carnitine into trimethylamine-N-oxide (TMAO). This compound increases the risk of atherosclerosis and cardiovascular diseases.

Importance of Intestinal Microbiota in Immune Diseases

The intestine contains a large proportion of the body’s immune cells. Therefore, microbiota is directly connected with immune system regulation.

Allergic Diseases

Disorders in microbiota formation during childhood may lead to allergies, atopic dermatitis, and bronchial asthma. Excessive antibiotic use reduces beneficial bacteria and enhances allergic responses.

Autoimmune Diseases

Dysbiosis is observed in rheumatoid arthritis, type 1 diabetes mellitus, Crohn’s disease, and ulcerative colitis. When microbiota balance is disturbed, the immune system may produce antibodies against the body’s own tissues.

Inflammatory Bowel Diseases

In Crohn’s disease and ulcerative colitis, changes in microbiota composition intensify inflammation. Butyrate-producing bacteria are significantly reduced.

Methods of Restoring Intestinal Microbiota

Rational Nutrition

Vegetables, fruits, legumes, whole grains, and fermented foods stimulate the growth of beneficial bacteria.

Probiotics

Preparations containing Lactobacillus and Bifidobacterium help restore intestinal flora. They are useful in diarrhea, dysbiosis, and reduced immunity.

Prebiotics

Inulin, fructooligosaccharides, and pectin serve as nutrients for beneficial bacteria.

Rational Use of Antibiotics

Uncontrolled antibiotic use causes serious damage to microbiota. Therefore, antibiotics should be taken only under medical supervision.

Conclusion

Intestinal microbiota is one of the most important biological systems of the human body. It participates not only in digestion but also in metabolism, immune defense, vitamin synthesis, and regulation of inflammatory processes. Disturbance of microbiota balance may lead to obesity, diabetes mellitus, atherosclerosis, allergic, and autoimmune diseases.Healthy nutrition, an active lifestyle, and rational use of probiotics and prebiotics help maintain normal intestinal microbiota. In the future, microbiota-based personalized treatment methods are expected to become widely used in medicine.

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